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特許法第３０条第１項適用申請有り　平成１３年１０月１日　トワ商事株式会社頒分の「マカ・エキスパウダー」に発表

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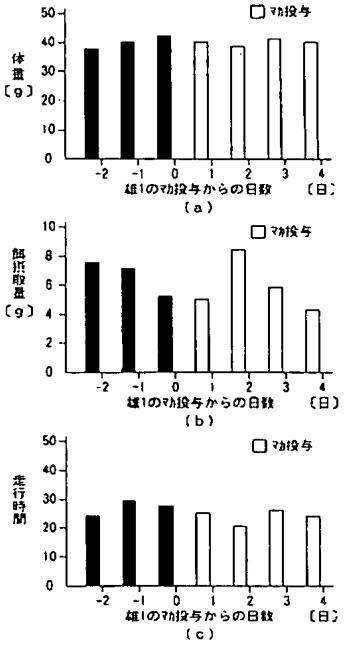
最終頁に続く

(54)【発明の名称】マカを含有した機能性食品

(57)【要約】
【課題】シワや白髪の増加、体力および生殖機能の低下に有効と考えられる血中成長ホルモン量上昇作用および持久力増加作用を有する機能性食品を提供する。
【解決手段】マカの根の乾燥物の６０％以上８０％以下の含水アルコール抽出物を含有する。血中成長ホルモン量上昇作用および持久力増加作用を有する。成長ホルモンの分泌が減少し、血中成長ホルモン量が低下したようなときに、５週間以上継続して摂取する。老化現象の抑制を期待できる。
【選択図】　図１



【特許請求の範囲】
【請求項１】
マカを含有し、
血中成長ホルモン量上昇作用を有する
ことを特徴としたマカを含有した機能性食品。
【請求項２】
マカを含有し、
持久力増加作用を有する
ことを特徴としたマカを含有した機能性食品。
【請求項３】
５週間以上の継続摂取により、血中成長ホルモン量が上昇する
ことを特徴とした請求項１記載のマカを含有した機能性食品。
【請求項４】
マカのアルコール抽出物を含有している
ことを特徴とする請求項１ないし３いずれか記載のマカを含有した機能性食品。
【請求項５】
マカのアルコール抽出物を含有し、
このアルコール抽出物は、６０％以上８０％以下の含水エタノールを含んでいる
ことを特徴とした請求項１ないし４いずれか記載のマカを含有した機能性食品。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】
本発明は、マカを含有した機能性食品に関する。
【０００２】
【従来の技術】
成長ホルモンは脳下垂体から分泌され、窒素保持能力を改善し、異化能力が低下した場合に脂肪動員と蛋白合成とを促進させる効果が知られている。そして、成長ホルモンは、各種ホルモンによる分泌調節を受け、脈動的な分泌動態があり、日内変動が認められるものの恒常性が保たれている。しかし、加齢などにより成長ホルモンの分泌低下が起こると、シワや白髪の増加、体力および生殖機能の低下をはじめとする、いわゆる老化現象が出やすくなると考えられている。
【０００３】
そこで、薬剤ではなく、人体に安全で血中成長ホルモン量上昇作用を有する、いわゆる機能性食品の開発が強く望まれているが、この要望を完全に満たすものは未だないのが現状である。
【０００４】
従来、ペルーのアンデス地方の高地原産の根菜であるマカ（レピディウム・メイエニワルプ；Ｌｅｐｉｄｉｕｍ　ｍｅｙｅｎｉｉ－Ｗａｌｐ，Ｃｒｕｃｉｆｅｒａｅ）が、南米アンデスの原住民の間では、永年伝承薬として不妊治療、滋養強壮などに使われており、民間伝承薬として用いられ、栄養不良、貧血症、不妊症、精力減退症などへの有効性が知られている（例えば、特許文献１および２参照。）。
【０００５】
【特許文献１】
特開２０００－３１６５２８号公報（第２－３頁）
【０００６】
【特許文献２】
特開２００１－１３６９２０号公報（第５－６頁）
【０００７】
【発明が解決しようとする課題】
しかしながら、上記マカの乾燥物中には、蛋白質や食物繊維含量が比較的高く、特にリジ

ンやアルギニンの含有量が高く、また特殊成分としてベンジルグルコシレート（ベンジルまたはＰ－メトキシルベンジルイソチオシアネートを生成するグルコシノレート）などのグルコシノレート、ステロイド、フラボノイド、アルカロイド、ポリフェノール、サポニン、テルペン類などの存在が知られているが、これらの成分の生理作用や有効性との関連についてはほとんど知られていないという問題を有している。

【０００８】

本発明は、このような点に鑑みなされたもので、血中成長ホルモン量上昇作用を有するマカを含有した機能性食品を提供する。

【０００９】

【課題を解決するための手段】

請求項１記載のマカを含有した機能性食品は、マカを含有し、血中成長ホルモン量上昇作用を有するものである。

【００１０】

そして、マカを含有した食品を血中成長ホルモン量が低下した場合に摂取することにより、血中成長ホルモン量を適度に上昇できる。

【００１１】

請求項２記載のマカを含有した機能性食品は、マカを含有し、持久力増加作用を有するものである。

【００１２】

そして、マカを含有した食品を摂取することにより、持久力を増加できる。

【００１３】

請求項３記載のマカを含有した機能性食品は、請求項１記載のマカを含有した機能性食品において、５週間以上の継続摂取により、血中成長ホルモン量が上昇するものである。

【００１４】

そして、マカを含有した食品を、５週間以上の継続して摂取することにより、いわゆる老化現象の抑制を期待できる。

【００１５】

請求項４記載のマカを含有した機能性食品は、請求項１ないし３いずれか記載のマカを含有した機能性食品において、マカのアルコール抽出物を含有しているものである。

【００１６】

そして、マカのアルコール抽出物を含有した機能性食品を摂取することにより、マカを含有した食品をより効率良く摂取できる。

【００１７】

請求項５記載のマカを含有した機能性食品は、請求項１ないし４いずれか記載のマカを含有した機能性食品において、マカのアルコール抽出物を含有し、このアルコール抽出物は、６０％以上８０％以下の含水エタノールを含んでいるものである。

【００１８】

そして、６０％以上８０％以下の含水エタノールを含んだマカのアルコール抽出物を含有させることにより、マカを含有した食品をより効率良く摂取できる。

【００１９】

【発明の実施の形態】

以下、本発明の実施の一形態のマカを含有した機能性食品を説明する。

【００２０】

まず、マカの根の乾燥物（チップ）を３０メッシュ以上１００メッシュ以下程度に粉砕する。そして、この粉砕したマカの根のチップを、室温（より抽出効率を上げる場合には４０℃程度の温度）で４８時間以上７２時間以下含水アルコールに浸漬してエキス分を抽出する。抽出液は、そのまま減圧下に濃縮乾固してもよく、抽出液にデキストリン、ソルビトールなどの乾燥助剤を加えて噴霧乾燥してもよい。また、抽出した乾燥物を再度水に溶解し、活性炭、イオン交換樹脂処理などにより更に精製して濃縮あるいは乾固してもよい。これら乾燥物は、適宜ブレンダなどで粉砕して使用する。用いられるアルコールは、エ

タノール、プロパノールなどの低級アルコールであり、通常６０％以上８０％以下の含水エタノールをアルコールとして含んでいることが好ましい。これらの結果、マカのアルコール抽出エキス乾燥物が得られる。

【００２１】

次いで、マカの含水アルコール抽出エキス乾燥物が、これを含有せしめた血中成長ホルモン量上昇作用を有する機能性食品として提供される形態としては、散剤、顆粒、錠剤、糖衣錠、カプセル、液剤、シロップ状のいずれであっても良く、これらは適宜助剤、賦香料とともに賦形されてもよい。用いられる賦形剤、希釈剤としては、ゼラチン、糖類、澱粉類、脂肪酸およびその塩、油脂、タルク、生理食塩水、その他のマスキング剤などが挙げられる。

【００２２】

これらのものをそのまま服用してもよいが、各種料理品、菓子、キャンデなどの食品に混ぜて服用するのも好都合である。服用量は、個人差、個体差が大きいけれども、通常成人一日当たり、水分８．１％、糖質７８．９％を含むアルコール抽出エキス乾燥物として、０．１ｇ以上１０ｇ以下である。

【００２３】

さらに、マカの乾燥物の含水アルコール抽出乾燥物を含有せしめた血中成長ホルモン量上昇作用を有する機能性食品は、常人が毎日食することに問題はないが、特になんらかの原因で成長ホルモンの分泌が減少し、血中成長ホルモン量が低下したようなときには、少なくとも４週間、通常５週間以上の継続した摂取が望ましい。

【００２４】

なお、マカの乾燥物中には、蛋白質や食物繊維含量が比較的高く、特にリジンやアルギニンの含有量が高く、また特殊成分としてグルコシノレート、ステロイド、フラボノイド、アルカロイド、ポリフェノール、サポニン、テルペン類などの有機化合物の存在が知られているため、これら特殊成分が活性酸素消去活性、ホルモン様活性、免疫賦活活性などに関係することが推定される。また、これら有機化合物は、特に、ヒトに対して不妊治療に効果のあることからそのグルコシノレートやフラボノイドにフイトエストロゲン作用が予想される。さらに、これら有機化合物により血糖値を低下させる作用が期待できるとともに、美顔や美肌効果なども期待できる。

【００２５】

【実施例】

以下、本発明のマカのアルコール抽出エキス乾燥物を含有せしめた血中成長ホルモン量上昇作用を有する機能性食品を、実験例を用いて更に詳細に説明する。

【００２６】

（実験例１）

マカ・エキスパウダの調製

まず、洗って乾燥させたペルー産マカ（根）（トワ商事株式会社販売）を裁断しチップとし、これを３０メッシュ以上４０メッシュ以下に粉砕したものを用意した。

【００２７】

次いで、９８％エタノールに、予め活性炭およびイオン交換樹脂処理した純水を加えて６０％に希釈して含水エタノールを調製し、これの６００１に、マカの粉砕物１２０ｋｇを加えて室温で７２時間浸漬した。

【００２８】

そして、固形物を濾去して得た抽出液４８０１以上４９０１以下に質量％が３％の食品用デキストリンを添加して混合、これを噴霧乾燥してマカのアルコール抽出噴霧乾燥物（マカ・エキスパウダ）１５ｋｇを得、この後、この乾燥物をブレンダで粉砕して混合した。ここで、このマカ・エキスパウダの分析結果を表１に示す。

【００２９】

【表１】

	分析値〔質量%〕
水分	8．1
蛋白質	3．3
脂質	1．2
水不溶性食物繊維	0．0
水可溶性食物繊維	6．7
糖 ※	78．9
灰分	1．8

※：計算値

【００３０】
（実験例２）
カゼインを蛋白源（２０質量％）とするＡＩＮ－９３組成（リーブスなど、ジャーナル・オブ・ニュートリション、１２３巻１９２３頁、１９９３年（Ｊ．Ｎｕｔｒｉｔｉｏｎ、１２３、１９２３、１９９３））に準拠した半精製飼料を対照食とし、対照食に実験例１で得たマカ・エキスパウダを質量比で０．５％（０．５Ｍ）、５％（５Ｍ）添加し、飼料の一般組成が対照食と同一となるように調整したものを実験食（０．５Ｍ、５Ｍ）とした。これら飼料の組成を表２に示す。なお、ＡＩＮ－９３は、米国国立栄養研究所が１９９３年に発表したマウスおよびラットを用いた栄養研究のための標準精製飼料組成である。
【００３１】
【表２】

〔質量%〕

飼料成分	対照食(MC)	０．５Ｍ	５Ｍ
マカ・エキスパウダ	0	0．5	5．0
ミルクカゼイン	20．0	20．0	19．8
L・シスチン	0．3	0．3	0．3
大豆油	10．0	9．9	9．9
ミネラル混合物（ＡＩＮ－９３Ｇ）	3．5	3．5	3．5
ビタミン混合物（ＡＩＮ－９３ＶＸ）	1．0	1．0	1．0
セルロースパウダ	5．0	5．0	4．7
コーンスターチ	36．8	36．4	32．8
α―コーンスターチ	13．2	13．2	13．2
シュークロース	10．0	10．0	10．0
コリン酒石酸重水素塩	0．25	0．25	0．25

【００３２】
そして、７週齢の雄性ウイスターラット（日本エスエルシー株式会社より購入）を各群６匹ずつ使用して、１週間対照食にて予備飼育した後、温度２２．０±２．０℃、湿度５５．０±５．０％、１２時間の明暗切り替え方式（明期は午前８時から午後８時まで、暗期は午後８時から午前８時まで）で、飲み水（水道水）とともに、飼料自由摂取下に５週間飼育した。なお、本動物実験は「近畿大学医学部動物実験の指針」に則って実施した。そして、実験の間、１日置きに体重と飼料摂取量とを測定した。結果として、体重測定値を表３に示し、飼料摂取量動向を表４に示す。
【００３３】

【表３】

体　重　推　移（各群６匹の平均体重ｇ）

試験開始から日目	対照食	０．５Ｍ	５Ｍ	試験開始から日目	対照食	０．５Ｍ	５Ｍ
2	１６７	１６６	１６６	２０	２６３	２６０	２５６
4	１８３	１８２	１７８	２２	２６８	２６６	２６２
6	１９４	１９７	１９２	２４	２７３	２７２	２６５
8	２１３	２１３	２０８	２６	２８０	２７６	２７２
１０	２２３	２２３	２２０	２８	２８５	２８２	２７５
１２	２３５	２３６	２３６	３０	２８８	２８５	２８０
１４	２３９	２４０	２３８	３２	２９４	２９２	２８２
１６	２４４	２４３	２４０	３４	２９８	２９６	２８９
１８	２５５	２５５	２４８	３６	３０４	３０１	２９３

【００３４】

【表４】

各群の平均飼料摂取量　〔g/2匹/2日〕

試験開始から日目	対照食	０．５Ｍ	５Ｍ	試験開始から日目	対照食	０．５Ｍ	５Ｍ
2	５４	５０	４８	２０	６４	５６	５４
4	７４	６９	６２	２２	６１	６０	５７
6	７０	７６	６８	２４	５９	６５	５７
8	８２	７９	７８	２６	５８	５５	５４
１０	７１	７５	７７	２８	５５	５７	５３
１２	６６	６４	７１	３０	５４	５６	５５
１４	６５	６４	６２	３２	５４	５８	５２
１６	６４	６５	５６	３４	５３	５４	５４
１８	６３	６０	５５	３６	５４	５５	５５

【００３５】

また、実験開始から２週間後、無絶食条件でエーテルで麻酔下、鎖骨下静脈からヘパリン（１５単位）含有シリコンコートマイクロスピッツに一部採血（約１ｍｌ）し、血清を分離（２５００ｒｐｍ、１５分、４℃）した。また、実験開始より５週間後の採血は、無絶食条件でエーテルで麻酔下、腹部大動脈より行い、上記と同一条件の血漿を得た。

【００３６】

さらに、実験開始から２週間後に得られた血漿、および５週間後に得られた血漿中の成長ホルモン量の測定は、ラット成長ホルモン酵素イムノアッセイ（ＥＩＡ）システム（Ａｍｅｒｓｈａｍ　Ｌｉｆｅ　Ｓｃｉｅｎｃｅ，　Ｅｎｇｌａｎｄ）を用いた。そして、２週間後の血漿中のホルモン量を表５に示し、５週間後に得られた血漿中の成長ホルモン量を表６に示す。

【００３７】

【表５】

２週間投与後の血漿中成長ホルモン濃度〔ｎｇ／ｍｌ〕		
対照食	０．５Ｍ	５Ｍ
９２．３±４．９	８８．７±８．０	８３．６±７．５

ｎ＝6、平均値±標準誤差

【００３８】
【表６】

５週間投与後の血漿中成長ホルモン濃度〔ｎｇ／ｍｌ〕		
対照食	０．５Ｍ	５Ｍ
１０３．２±８．１	１２０．３±７．８	１２０．６±１２．６

ｎ＝6、平均値±標準誤差

【００３９】
これらの結果、表３および表４に示すように、マカ・エキスパウダを添加した飼料を投与して飼育したウイスターラットと、対照飼料を投与して飼育したウイスターラットとの成長度（増体量）および飼料摂取量に差は認められず、有害作用も全く認められず、３群とも順調な生育が認められた。
【００４０】
また、表５および表６に示すように、投与２週間後の血漿中の成長ホルモン量は、実験群（マカを投与した群）において若干低い傾向が観られるが、３群間に有意な差は認められなかった。さらに、投与５週間後に得られた血漿中の成長ホルモン量は、実験群（０．５Ｍ、５Ｍ両群）で対照群と比較して高い値が認められた。
【００４１】
したがって、マカの乾燥物の含水アルコール抽出乾燥物を添加した飼料をウイスターラットに５週間継続して供与して飼育したところ、ラットは順調に生育し、これらウイスターラットにおける血漿中の成長ホルモンが増加した。この結果、主成分として、マカの乾燥物の含水アルコール抽出乾燥物を含有せしめた機能性食品を摂取することにより、人体に安全で、副作用なく、血中成長ホルモン量が上昇することが分かった。
【００４２】
（実験例３）
次に、本発明のマカのアルコール抽出エキス乾燥物を含有せしめた機能性食品の経口摂取によるマウスの持久力に及ぼす影響を、実験例を用いて説明する。
【００４３】
まず、最初に生体機能全体に対する作用を評価する目的で、持久力に対するマカの経口摂取の影響について検討した。
【００４４】
持久力の評価対象としては、ほぼ成獣に達したと考えられる１１週令のＤＤＹマウスを使用した。これらＤＤＹマウスは、研究室に到着した後、１週間馴らし飼育をした後に使用した。また、持久力としては、直径１５ｃｍの円筒の内側に各ＤＤＹマウスを入れ、これら各ＤＤＹマウスを一定速度で走らせて円筒を回転させ、これら各ＤＤＹマウスが一定速度で走れなくなるまでの時間（距離）を指標として評価した。なお、走行実験は、一日のうちの同じ時間帯に測定した。
【００４５】
また、マカはマカの根の乾燥物を微粉末にした後、水に０．２５ｍｇ／ｍｌとなるように

懸濁し、各ＤＤＹマウスの胃内にゾンデにて０．２５ｍｌを直接単回投与した。

【００４６】

ここで、マウスの選抜に関しては、初めどのようなマウスでも走行動態に大きな差はないであろうと仮定して１０匹のグループに分け測定を始めたが、走行能力あるいは走行意志の欠如などの点で個体差が大きく予備走行テストで選抜しないと単純なグループ分けでは実験に使えないことが判明した。

【００４７】

そこで、同一週令のマウスの中で、走行能力に差はあるが常に比較的安定して走行することを基準に、個体をまず選抜した。ところが、平常の走行能力に大きく差のない２つのマウス群（対照群および摂取群）を作るのが困難であったため、選抜された常に比較的安定して走行する個体群に対して、マカ投与の前後での走行時間を比較した。

【００４８】

次いで、マカの投与容量が食餌の摂取に及ぼす影響に関しては、マカをゾンデで投与する容量（ｍｌ）を変化させてマウスの食餌の摂取量に与える影響を調べた結果、０．５ｍｌ以上投与した場合に食餌の摂取量が減少することが判明し、投与容量が０．１ｍｌと決定した。

【００４９】

さらに、マカの単回投与がマウスの持久走に与える影響に関しては、上記のように選抜したマウス７匹（１匹死亡）につき、マカの投与前の走行時間（距離）と、０．１ｍｇ／ｍｌのマカ懸濁液を０．２５ｍｌ投与した後の３日間走行時間（距離）との変化を測定した。この結果、図１ないし図６に示すように、６匹中４匹で走行時間が、２４時間後においてで２５％以上５０％以下の割合で増加した。なお、後の２匹には変化がなかった。また、２日および３日後でも減少加減であるが少し高い割合を示した。さらに、４日以降は、元の割合に戻ったので、この単回投与量の効果は２日以上３日以下の間持続すると解釈できた。

【００５０】

上述した結果から、マカの経口投与によるマウスの持久力（持久走）に与える影響を検討した。なお、摂取量の正確な量を把握するためゾンデで強制投与する方法を用いて投与した。マウスの食餌摂取量に影響を与えない投与容量（０．１ｍｌ）で１匹当たり０．０２５ｍｇ／日のマカを与えた結果、６匹中４匹（６６．６％）で、持久力の増加が認められ、他の２匹においても持久力の低下は示されなかった。

【００５１】

また、用いたマウス１０匹（雄５匹、雌５匹）中、雌１匹が途中死亡し、雄３匹が衰弱したのではなく走行状態からの逃避のため測定不能になったため、雌４匹および雄２匹の結果であるが、図１ないし図６に示すように、雌では４匹中３匹（７５％）、雄では２匹中１匹（５０％）の割合で効果が認められた。

【００５２】

（実験例４）

次に、本発明のマカのアルコール抽出エキス乾燥物を含有せしめた機能性食品の連続投与によるマウスの持久力に及ぼす効果を、実験例を用いて説明する。

【００５３】

まず、上記実験例３と同様のＤＤＹマウス（雄２匹および雌４匹）を用意し、これら各マウスそれぞれに上記実験例３と同様のマカの乾燥物を複数回数日置きに継続して経口摂取させて連続投与した。

【００５４】

具体的には、まず、図７ないし図１２に示すように、実験開始前３日間の走行時間を測定し、これら３日間における平均走行時間を算出した。なお、これら算出した平均走行時間を、図７ないし図１２中において破線として示した。

【００５５】

この後、実験開始日（０日目）、４日目、１１日目および１３日目のそれぞれにおいて各

マウスにマカの乾燥物をそれぞれ所定量投与した。ここで、図７ないし図１２においては、マカの乾燥物を投与した日を矢印にて示した。

【００５６】

この結果、マカの乾燥物を投与させる度に、投与から１日後および２日後に走行距離が延長したマウスが観察された。具体的には、図７ないし図１２に示すマウス６匹中、図７に示すマウス（雄１）、図９に示すマウス（雄３）、図１１に示すマウス（雌５）、図１２に示すマウス（雌６）の４匹のマウスにおいて、マカの乾燥物を投与してから１日目および２日目に走行距離の延長が確認できた。

【００５７】

また、図１０に示すマウス（雌４）は、途中（実験開始６日目から）で走行距離の測定が不可能となったが、実験開始日でのマカの投与では走行距離の延びが確認できた。

【００５８】

以上のことから、６匹中５匹のマウスにおいて、マカを投与する毎に走行距離の延長が確認できたことにより、マカの摂取により持久力の向上が確認できた。また、図８に示すマウス（雌２）以外の各マウスにおいては、Ｐ＜０．０５で統計的に有意差があることが確認できた。

【００５９】

（製剤例１）

実験例１で得たマカ・エキスパウダの粉末１ｇに柑橘フレーバ０．０１ｇと馬鈴薯澱粉１０ｇとを混合し、常法により錠剤（食品）を調製した。

【００６０】

（製剤例２）

実験例１で得たマカ・エキスパウダの粉末０．５ｇに、精製白糖１０ｇと、柑橘フレーバ０．０５ｇとを加えた組成のものに、水を加えて全量１２０ｍｌとし、プラスチックボトル詰めとして飲料製品（ドリンク剤）を調製した。

【００６１】

【発明の効果】

請求項１記載のマカを含有した機能性食品によれば、マカを含有した機能性食品を摂取することにより、血中成長ホルモン量を上昇できる。

【００６２】

請求項２記載のマカを含有した機能性食品によれば、マカを含有した機能性食品を摂取することにより、持久力を増加できる。

【００６３】

請求項３記載のマカを含有した機能性食品によれば、請求項１記載のマカを含有した機能性食品の効果に加え、マカを含有した機能性食品を、５週間以上の継続して摂取することにより、いわゆる老化現象の抑制を期待できる。

【００６４】

請求項４記載のマカを含有した機能性食品によれば、請求項１ないし３いずれか記載のマカを含有した機能性食品の効果に加え、マカのアルコール抽出物を含有した機能性食品を摂取することにより、マカを含有した食品をより効率良く摂取できる。

【００６５】

請求項５記載のマカを含有した機能性食品によれば、請求項１ないし４いずれか記載のマカを含有した機能性食品の効果に加え、６０％以上８０％以下の含水エタノールを含んだマカのアルコール抽出物を含有するので、マカを含有した機能性食品をより効率良く摂取できる。

【図面の簡単な説明】

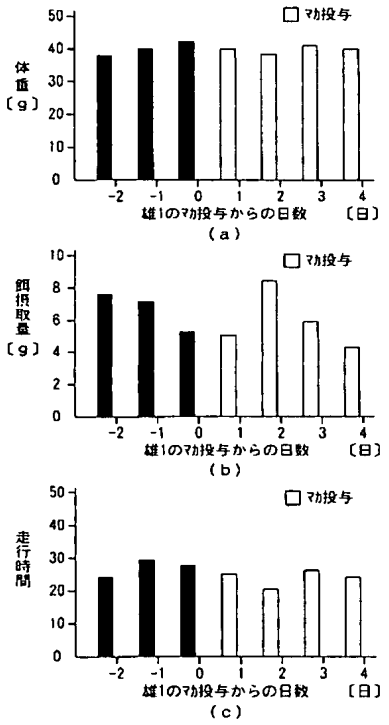
【図１】本発明のマカを含有した機能性食品をマウス（雄１）に投与した実験例を示すグラフである。

（ａ）　マカ投与前後の体重の変化を示すグラフ。

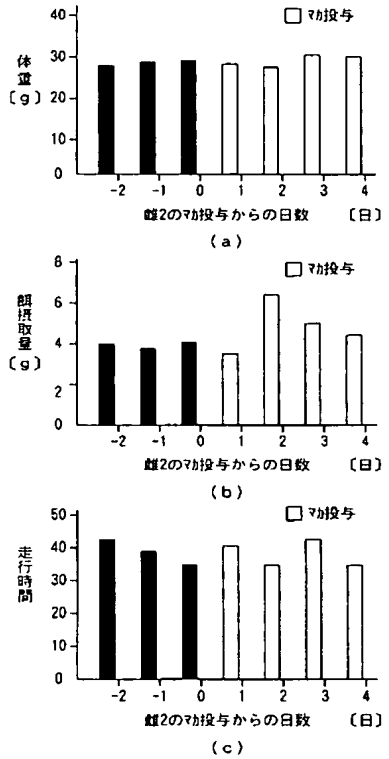
（ｂ）　マカ投与前後の餌摂取量の変化を示すグラフ。

（ｃ）　マカ投与前後の運動持久力の変化を示すグラフ。
【図２】同上マカを含有した機能性食品をマウス（雌２）に投与した実験例を示すグラフである。
（ａ）　マカ投与前後の体重の変化を示すグラフ。
（ｂ）　マカ投与前後の餌摂取量の変化を示すグラフ。
（ｃ）　マカ投与前後の運動持久力の変化を示すグラフ。
【図３】同上マカを含有した機能性食品をマウス（雄３）に投与した実験例を示すグラフである。
（ａ）　マカ投与前後の体重の変化を示すグラフ。
（ｂ）　マカ投与前後の餌摂取量の変化を示すグラフ。
（ｃ）　マカ投与前後の運動持久力の変化を示すグラフ。
【図４】同上マカを含有した機能性食品をマウス（雌４）に投与した実験例を示すグラフである。
（ａ）　マカ投与前後の体重の変化を示すグラフ。
（ｂ）　マカ投与前後の餌摂取量の変化を示すグラフ。
（ｃ）　マカ投与前後の運動持久力の変化を示すグラフ。
【図５】同上マカを含有した機能性食品をマウス（雌５）に投与した実験例を示すグラフである。
（ａ）　マカ投与前後の体重の変化を示すグラフ。
（ｂ）　マカ投与前後の餌摂取量の変化を示すグラフ。
（ｃ）　マカ投与前後の運動持久力の変化を示すグラフ。
【図６】同上マカを含有した機能性食品をマウス（雌６）に投与した実験例を示すグラフである。
（ａ）　マカ投与前後の体重の変化を示すグラフ。
（ｂ）　マカ投与前後の餌摂取量の変化を示すグラフ。
（ｃ）　マカ投与前後の運動持久力の変化を示すグラフ。
【図７】同上マカを含有した機能性食品を連続投与したマウス（雄１）の走行時間を示すグラフである。
【図８】同上マカを含有した機能性食品を連続投与したマウス（雌２）の走行時間を示すグラフである。
【図９】同上マカを含有した機能性食品を連続投与したマウス（雄３）の走行時間を示すグラフである。
【図１０】同上マカを含有した機能性食品を連続投与したマウス（雌４）の走行時間を示すグラフである。
【図１１】同上マカを含有した機能性食品を連続投与したマウス（雌５）の走行時間を示すグラフである。
【図１２】同上マカを含有した機能性食品を連続投与したマウス（雌６）の走行時間を示すグラフである。

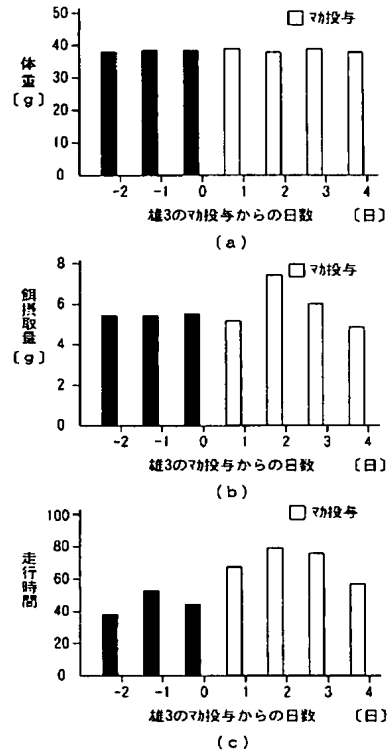
【図１】


マカ投与
体重〔g〕
雄1のマカ投与からの日数 〔日〕
(a)
餌摂取量〔g〕
雄1のマカ投与からの日数 〔日〕
(b)
走行時間
雄1のマカ投与からの日数 〔日〕
(c)

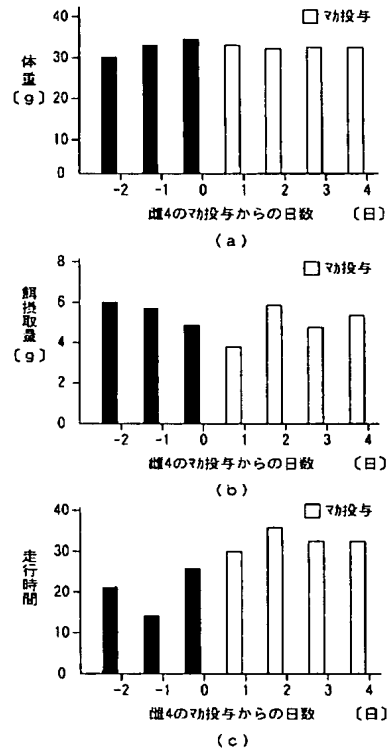
【図２】


マカ投与
体重〔g〕
雌2のマカ投与からの日数 〔日〕
(a)
餌摂取量〔g〕
雌2のマカ投与からの日数 〔日〕
(b)
走行時間
雌2のマカ投与からの日数 〔日〕
(c)

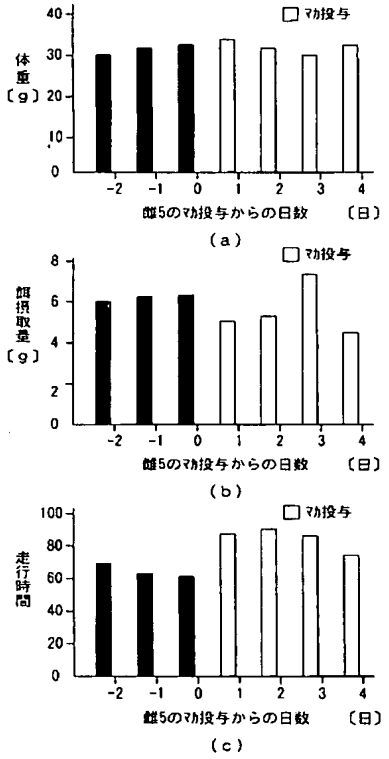
【図３】


マカ投与
体重〔g〕
雄3のマカ投与からの日数 〔日〕
(a)
餌摂取量〔g〕
雄3のマカ投与からの日数 〔日〕
(b)
走行時間
雄3のマカ投与からの日数 〔日〕
(c)

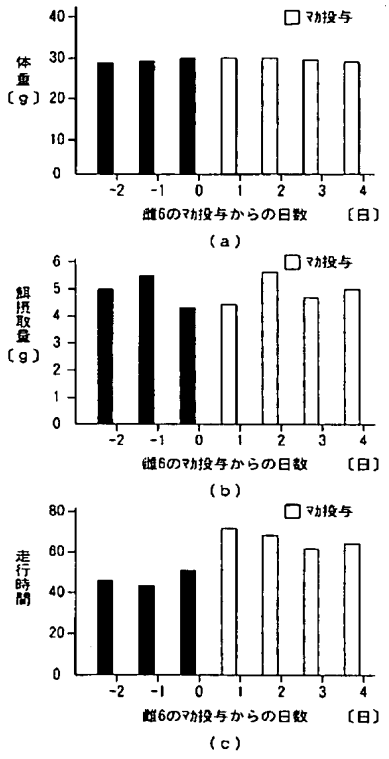
【図４】


マカ投与
体重〔g〕
雌4のマカ投与からの日数 〔日〕
(a)
餌摂取量〔g〕
雌4のマカ投与からの日数 〔日〕
(b)
走行時間
雌4のマカ投与からの日数 〔日〕
(c)

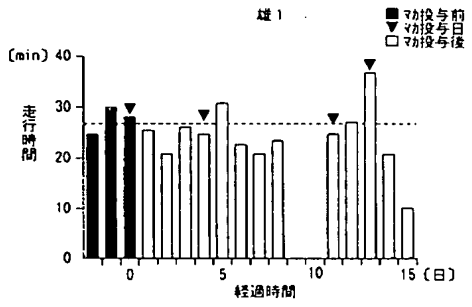
【図５】



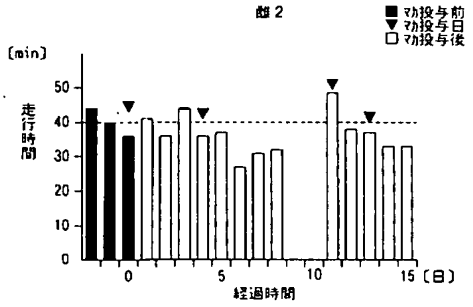
【図６】



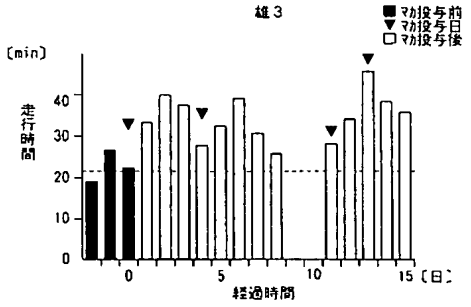
【図７】



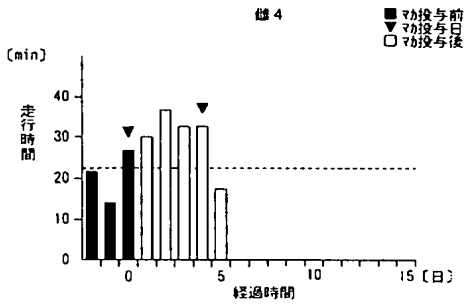
【図８】



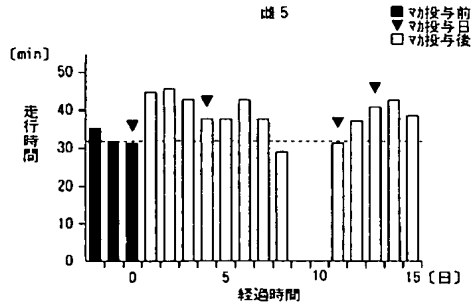
【図９】



【図１０】



【図１１】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▼マカ投与日
□マカ投与後
(min)
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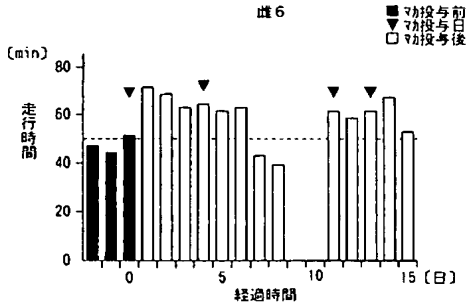
40
30
20
10
0
0
5
10
15 (日)
経過時間

【図１２】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□マカ投与後
(min)
走行時間
80
60
40
20
0
0
5
10
15 (日)
経過時間

フロントページの続き

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Ｆターム(参考) 4B018 MD61　ME04

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1]
MAKA is contained,
It has the amount rise operation of growth hormones in blood.
Functional food containing MAKA characterized by things.
[Claim 2]
MAKA is contained,
It has the increment operation in tenacity.
Functional food containing MAKA characterized by things.
[Claim 3]
By continuation intake for five weeks or more, the amount of growth hormones in blood rises.
Functional food containing MAKA according to claim 1 characterized by things.
[Claim 4]
The alcoholic extract of MAKA is contained.
Claim 1 characterized by things thru/or functional food which contained MAKA of a publication 3 either.
[Claim 5]
The alcoholic extract of MAKA is contained,
This alcoholic extract contains 80% or less of water ethanol 60% or more.
Claim 1 characterized by things thru/or functional food which contained MAKA of a publication 4 either.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]
This invention relates to the functional food containing MAKA.
[0002]
[Description of the Prior Art]
A growth hormone is fossa-hypophysis secreted, nitrogen maintenance capacity is improved, and when catabolism capacity declines, the effectiveness of promoting lipid mobilization and protein synthesis is known. And a growth hormone receives the secretion accommodation by various hormone, and has a pulsation secretion moving state, and homeostasis is maintained although a daily variation is accepted. However, if the secretion fall of a growth hormone takes place by aging etc., it is thought that it becomes easy to come out of the so-called degraded phenomena including the fall of the increment in Siwa or canities, physical strength, and the generative function.
[0003]
Then, although it is safe for the body instead of drugs and development of the so-called functional food which has the amount rise operation of growth hormones in blood is desired strongly, the present condition is that there is still nothing that fills this request completely.
[0004]
Conventionally, MAKA (repi DIUMU MEIENIWARUPU; Lepidium meyenii-Walp, Cruciferae) which is the high-ground native root vegetables of the Andes district in Peru is used for infertility treatment, nourishment sthenia, etc. as a tradition medicine for years among the natives of the South America Andes, it is used as a folklore medicine, and the effectiveness to malnutrition, anemia, infertility, energy ******, etc. is known (for example, the patent reference 1 and 2 reference.).
[0005]
[Patent reference 1]
JP,2000-316528,A (the two - 3rd page)
[0006]
[Patent reference 2]
JP,2001-136920,A (the five - 6th page)
[0007]
[Problem(s) to be Solved by the Invention]
However, in the dry matter of above-mentioned MAKA, protein and a dietary fiber content are comparatively high. especially -- the content of a lysine or an arginine -- high -- moreover -- as a special component -- a benzyl guru -- chewiness -- glucosinolates, such as a rate (glucosinolate which generates benzyl or P-methoxyl benzyl isothiocyanate), -- Although existence of a steroid, flavonoid, alkaloid, polyphenol, a saponin, terpenes, etc. is known, about the physiological function of these components, or relation with effectiveness, it has the problem that it is hardly known.
[0008]
This invention was made in view of such a point, and offers the functional food containing MAKA which has the amount rise operation of growth hormones in blood.
[0009]
[Means for Solving the Problem]

The functional food containing MAKA according to claim 1 contains MAKA, and has the amount rise operation of growth hormones in blood.
[0010]
And the amount of growth hormones in blood can be moderately gone up by taking in the food containing MAKA, when the amount of growth hormones in blood falls.
[0011]
The functional food containing MAKA according to claim 2 contains MAKA, and has the increment operation in tenacity.
[0012]
And tenacity can be increased by taking in the food containing MAKA.
[0013]
In the functional food with which the functional food containing MAKA according to claim 3 contained MAKA according to claim 1, the amount of growth hormones in blood rises by continuation intake for five weeks or more.
[0014]
And the so-called control of a degraded phenomenon is [the food containing MAKA] expectable by [for five weeks or more] taking in continuously.
[0015]
The functional food containing MAKA according to claim 4 contains the alcoholic extract of MAKA in claim 1 thru/or the functional food which contained MAKA of a publication 3 either.
[0016]
And the food containing MAKA can be more efficiently taken in by taking in the functional food containing the alcoholic extract of MAKA.
[0017]
The functional food containing MAKA according to claim 5 contains the alcoholic extract of MAKA in claim 1 thru/or the functional food which contained MAKA of a publication 4 either, and this alcoholic extract contains 80% or less of water ethanol 60% or more.
[0018]
And the food containing MAKA can be more efficiently taken in by making the alcoholic extract of MAKA which contained 80% or less of water ethanol 60% or more contain.
[0019]
[Embodiment of the Invention]
Hereafter, the functional food containing MAKA of one gestalt of operation of this invention is explained.
[0020]
First, the dry matter (chip) of the root of MAKA is ground to 30 or more mesh 100 or less mesh extent. And the chip of the root of this ground MAKA is immersed in water alcohol for 72 or less hours for 48 hours or more at a room temperature (when gathering extraction efficiency, it is the temperature of about 40 degrees C), and an extractive matter is extracted. An extract may carry out concentration hardening by drying under reduced pressure as it is, and may add and carry out spray drying of the drying aid, such as a dextrin and a sorbitol, to an extract. Moreover, the extracted dry matter is again dissolved in water, and activated carbon, ion-exchange-resin processing, etc. may refine further, and you may condense or harden by drying. These dry matters are suitably ground and used with a blender etc. The alcohol used is lower alcohol, such as ethanol and propanol, and it is desirable that 80% or less of water ethanol is usually included as alcohol 60% or more. The alcoholic extract extractives dry matter of MAKA is obtained these results.
[0021]
Subsequently, the water alcoholic extract extractives dry matters of MAKA may be powder, granulation, a tablet, a sugar-coated tablet, a capsule, liquids and solutions, and sirupy any as a gestalt offered as functional food which has the amount rise operation of growth hormones in blood which made this contain, and size enlargement of these may be suitably carried out with an assistant and the charge of aromatizing. As the excipient used and a diluent, the masking reagent of gelatin, a saccharide, starch, a fatty acid and its salt, fats and oils, talc, a physiological saline, and others etc. is mentioned.
[0022]
Although these things may be taken as they are, it is also convenient to mix food, such as various cooking articles, confectionery, and Kandy, and to take. Although individual difference and individual difference of a dose

are large, it is 0.1g or more 10g or less as an alcoholic extract extractives dry matter which usually contains per adult day, 8.1% of moisture, and 78.9% of sugar.
[0023]
Furthermore, although it is satisfactory for usual state people eating the functional food which has the amount rise operation of growth hormones in blood which made the water alcoholic extract dry matter of the dry matter of MAKA contain every day, when secretion of a growth hormone decreases especially by a certain cause and the amount of growth hormones in blood falls, the continued intake for five weeks or more is usually desirable for at least four weeks.
[0024]
In addition, in the dry matter of MAKA, protein and a dietary fiber content are comparatively high, especially the content of a lysine or an arginine is high, and since existence of organic compounds, such as glucosinolate, a steroid, flavonoid, alkaloid, polyphenol, a saponin, and terpenes, is known as a special component, it is presumed that these special components are related to active oxygen elimination activity, hormone Mr. activity, immunity activation activity, etc. Moreover, since these organic compounds have effectiveness in infertility treatment to Homo sapiens especially, a phytoestrogen operation is expected by the glucosinolate and flavonoid. Furthermore, while the operation which reduces the blood sugar level with these organic compounds is expectable, facial treatment, a beautiful skin effect, etc. are expectable.
[0025]
[Example]
The functional food which has hereafter the amount rise operation of growth hormones in blood which made the alcoholic extract extractives dry matter of MAKA of this invention contain is further explained to a detail using the example of an experiment.
[0026]
(Example 1 of an experiment)
Preparation of MAKA extractives powder
First, it washed, dried MAKA from Peru (root) (TOWA business-affairs incorporated company sale) was judged, it considered as the chip, and what ground this to 30 or more-mesh 40 or less meshes was prepared.
[0027]
Subsequently, activated carbon and the pure water which carried out ion-exchange-resin processing were beforehand added to ethanol 98%, it diluted to 60%, and water ethanol was prepared, and 120kg of grinding objects of MAKA was added to 600l. of this, and it was immersed in it at the room temperature for 72 hours.
[0028]
And mass % added 3% of food-grade dextrin to 490l. or less of 480l. or more extracts which filtered out and obtained the solid, and was mixed to them, and spray drying of this was carried out and 15kg (MAKA extractives powder) of alcoholic extract spray drying objects of MAKA was obtained, and after this, the blender ground this dry matter and it mixed. Here, the analysis result of this MAKA extractives powder is shown in Table 1.
[0029]
[Table 1]

	分析値〔質量%〕
水分	8．1
蛋白質	3．3
脂質	1．2
水不溶性食物繊維	0．0
水可溶性食物繊維	6．7
糖 ※	78．9
灰分	1．8

※：計算値

[0030]
(Example 2 of an experiment)
The AIN-93 presentation which makes casein the source of protein (20 mass %) (Reeves etc.) Journal OBU new TORISHON, 123-volume 1923 pages, 1993 (J. it Nutrition(s)) Half-purified diet based on 123, 1923, and 1993 is considered as contrast foods. Addition of the MAKA extractives powder obtained in the example 1 of an experiment to contrast foods was carried out 5% (5M) 0.5% (0.5M) with the mass ratio, and what was adjusted so that the proximate composition of feed might become the same as that of contrast foods was made into experimental diet (0.5M, 5M). The presentation of these feed is shown in Table 2. In addition, AIN-93 are the standard purified diet presentation for the nutrition research using the mouse and rat which the U.S. National Institute of Nutrition announced in 1993.
[0031]
[Table 2]

〔質量%〕

飼料成分	対照食 (MC)	0.5M	5M
マカ・エキスパウダ	0	0.5	5.0
ミルクカゼイン	20.0	20.0	19.8
L・シスチン	0.3	0.3	0.3
大豆油	10.0	9.9	9.9
ミネラル混合物 (AIN-93G)	3.5	3.5	3.5
ビタミン混合物 (AIN-93VX)	1.0	1.0	1.0
セルロースパウダ	5.0	5.0	4.7
コーンスターチ	36.8	36.4	32.8
α—コーンスターチ	13.2	13.2	13.2
シュークロース	10.0	10.0	10.0
コリン酒石酸重水素塩	0.25	0.25	0.25

[0032]
And after using each six groups at a time 7-weeks old male Wistar rats (it purchases from Japan SLC, Inc.) and carrying out preliminary breeding by contrast foods for one week, it is the temperature of 22.0**2.0 degrees C, the humidity of 55.0**5.0%, and the light-and-darkness change method (for a ** term, a dark term is from 8:00 p.m. to 8:00 a.m. from 8:00 a.m. to 8:00 p.m.) of 12 hours, and bred for five weeks under feed free intake with drinking water (tap water). In addition, this animal experiment was carried out in conformity with "the guide of the Kinki University medical department animal experiment." And weight and the amount of feed intake were measured every other day during the experiment. As a result, weight measured value is shown in Table 3, and the amount trend of feed intake is shown in Table 4.
[0033]
[Table 3]

体　重　推　移（各群６匹の平均体重ｇ）

試験開始から日目	対照食	０．５Ｍ	５Ｍ	試験開始から日目	対照食	０．５Ｍ	５Ｍ
2	１６７	１６６	１６６	２０	２６３	２６０	２５６
4	１８３	１８２	１７８	２２	２６８	２６６	２６２
6	１９４	１９７	１９２	２４	２７３	２７２	２６５
8	２１３	２１３	２０８	２６	２８０	２７６	２７２
１０	２２３	２２３	２２０	２８	２８５	２８２	２７５
１２	２３５	２３６	２３６	３０	２８８	２８５	２８０
１４	２３９	２４０	２３８	３２	２９４	２９２	２８２
１６	２４４	２４３	２４０	３４	２９８	２９６	２８９
１８	２５５	２５５	２４８	３６	３０４	３０１	２９３

[0034]
[Table 4]

各群の平均飼料摂取量　〔g/2匹/2日〕

試験開始から日目	対照食	０．５Ｍ	５Ｍ	試験開始から日目	対照食	０．５Ｍ	５Ｍ
2	５４	５０	４８	２０	６４	５６	５４
4	７４	６９	６２	２２	６１	６０	５７
6	７０	７６	６８	２４	５９	６５	５７
8	８２	７９	７８	２６	５８	５５	５４
１０	７１	７５	７７	２８	５５	５７	５３
１２	６６	６４	７１	３０	５４	５６	５５
１４	６５	６４	６２	３２	５４	５８	５２
１６	６４	６５	５６	３４	５３	５４	５４
１８	６３	６０	５５	３６	５４	５５	５５

[0035]
Moreover, it collected blood from the subclavian vein in part to the heparin (15 units) content silicon coat micro spitz under anesthesia with the ether by the conditions of not abstaining from food, after [of experiment initiation] two weeks (about 1ml), and the blood serum was separated (2500rpm, 15 minutes, 4 degrees C). Moreover, blood collecting five weeks after was performed on the conditions of not abstaining from food, from experiment initiation, the ether performed it from the abdominal aorta under anesthesia, and the plasma of the same conditions as the above was obtained.
[0036]
Furthermore, measurement of the amount of growth hormones in the plasma obtained after [of experiment initiation] two weeks and the plasma obtained after five weeks used the rat growth hormone enzyme immunoassay (EIA) system (Amersham Life Science, England). And the amount of hormone in the plasma of two weeks after is shown in Table 5, and the amount of growth hormones in the plasma obtained after five weeks is shown in Table 6.
[0037]

[Table 5]

2週間投与後の血漿中成長ホルモン濃度〔ｎｇ／ｍｌ〕		
対照食	０．５Ｍ	５Ｍ
９２．３±４．９	８８．７±８．０	８３．６±７．５

ｎ＝6、平均値±標準誤差

[0038]
[Table 6]

5週間投与後の血漿中成長ホルモン濃度〔ｎｇ／ｍｌ〕		
対照食	０．５Ｍ	５Ｍ
１０３．２±８．１	１２０．３±７．８	１２０．６±１２．６

ｎ＝6、平均値±標準誤差

[0039]
As shown in Table 3 and 4 these results, the difference was not accepted, but adverse reaction was not accepted in whenever [growth-with Wistar-rats / which prescribed for the patient and bred the feed which added MAKA extractives powder /, and Wistar rats which prescribed for the patient and bred contrast feed], and (gain of body weight), the amount of feed intake at all, either, but growth with all three favorable groups was accepted in them.
[0040]
Moreover, although, as for the amount of growth hormones in the plasma after two weeks of administration, the inclination low a little was seen in the experimental group (group which prescribed MAKA for the patient) as shown in Table 5 and 6, the significant difference was not accepted in 3 between groups. Furthermore, as for the amount of growth hormones in the plasma obtained after five weeks of administration, as compared with the control group, the high value was accepted by the experimental group (0.5M, 5 M car group).
[0041]
Therefore, when it continued for five weeks to Wistar rats, they were supplied with the feed which added the water alcoholic extract dry matter of the dry matter of MAKA and it was bred to them, the rat was grown favorably and the growth hormone in the plasma in these Wistar rats increased. Consequently, it is safe for the body, there is no side effect, and by taking in the functional food which made the water alcoholic extract dry matter of the dry matter of MAKA contain as a principal component showed that the amount of growth hormones in blood rose.
[0042]
(Example 3 of an experiment)
Next, the effect affect the tenacity of the mouse by the ingestion of functional food which made the alcoholic extract extractives dry matter of MAKA of this invention contain is explained using the example of an experiment.
[0043]
First, the purpose which evaluates the operation over the whole living body function to the beginning considered the effect of the ingestion of MAKA to tenacity.
[0044]
The DDY mouse of 11 weeks old considered to have reached the adult mostly as a candidate for evaluation of tenacity was used. These DDY(s) mouse was used after arriving at a laboratory, and carrying out training breeding for one week. Moreover, as tenacity, each DDY mouse was put in inside the cylinder with a diameter of

15cm, each [these] DDY mouse was run with constant speed, the cylinder was rotated, and time amount (distance) until it becomes impossible for each [these] DDY mouse to run with constant speed was evaluated as an index. In addition, the transit experiment was measured in the same time zone of the days.
[0045]
Moreover, after MAKA used the dry matter of the root of MAKA as impalpable powder, it was suspended so that it might become water in ml and 0.25mg /, and carried out direct single-dose administration of the 0.25ml by the sound into the stomach of each DDY mouse.
[0046]
Here, although it divided into the group of ten animals, having assumed whether a big difference would have any mice in a transit moving state and measurement was begun at first about selection of a mouse, when individual difference did not select by the preliminary transit test greatly in respect of lack of transit capacity or transit volition etc., it became clear by the simple group division that it could not use for an experiment.
[0047]
Then, the individual was first selected on the basis of being stabilized comparatively and always running in the mouse of the same weeks old, although a difference is in transit capacity. However, since it was difficult to make two mouse groups (a control group and intake group) which do not have a difference in normal transit capacity greatly, it was stabilized comparatively and the transit time in MAKA administration order was always compared to the selected population it runs.
[0048]
Subsequently, as a result of investigating the effect which the capacity (ml) which prescribes MAKA for the patient by the sound is changed about the effect the administration capacity of MAKA affects intake of a diet, and it has on the intake of the diet of a mouse, when 0.5ml or more was prescribed for the patient, it became clear that the intake of a diet decreased and it was decided that administration capacity would be 0.1ml.
[0049]
Furthermore, change with the transit time before administration of MAKA (distance) and the transit time during three days (distance) after prescribing 0.25ml of 0.1mg [/ml] MAKA suspension for the patient was measured about seven mice (one-animal death) which the single-dose administration of MAKA selected as mentioned above about the effect which it has on the endurance running of a mouse. consequently, it is shown in drawing 1 thru/or drawing 6 -- as -- the inside of six animals -- four animals -- the transit time -- 24 hours after -- setting -- coming out -- 50% or less 25% or more -- it came out comparatively and increased. In addition, there was no change in two next animals. Moreover, although it was a reduction degree also after two days and three days, the somewhat high rate was shown. Furthermore, since it returned to the original rate after the 4th, it has been interpreted as maintaining the effectiveness of this amount of single-dose administration during the 3rd or less the 2nd day or more.
[0050]
From the result mentioned above, the effect which it has on the tenacity (endurance running) of the mouse by internal use of MAKA was considered. In addition, in order to grasp an amount with exact intake, a medicine was prescribed for the patient using the approach of carrying out forcible administration by the sound. As a result of giving 0.025mg [per animal / /] MAKA day by the administration capacity (0.1ml) which does not affect the diet intake of a mouse, among six animals, by four animals (66.6%), the increment in tenacity was accepted and the fall of tenacity was not shown in other two animals.
[0051]
Moreover, although it is as a result of four females and two males since one female died the middle among ten used mice (five males, five females), and three males did not become weak but it became measurement impossible for escape from a run state As shown in drawing 1 thru/or drawing 6 , among four animals, for the female, effectiveness was accepted by three animals (75%), and was accepted at a rate of one animal (50%) among two animals by the male.
[0052]
(Example 4 of an experiment)
Next, the effectiveness exerted on the tenacity of the mouse by the repetitive administration of the functional food which made the alcoholic extract extractives dry matter of MAKA of this invention contain is explained using the example of an experiment.
[0053]
First, the same DDY mouse (two males and four females) as the above-mentioned example 3 of an experiment

was prepared, the ingestion of the dry matter of the same MAKA as the above-mentioned example 3 of an experiment was continued and carried out to each of each [these] mouse every count day of plurality, and repetitive administration was carried out.

[0054]

First, as shown in drawing 7 thru/or drawing 12 , the transit time for front [experiment initiation] three days was measured, and, specifically, the mean transit time for these three days was computed. In addition, the these-computed mean transit time was shown as a broken line in drawing 7 thru/or drawing 12 .

[0055]

Then, in each on the 11th and the 13th, specified quantity administration of the dry matter of MAKA was carried out [the experiment opening day (the 0th day) and] on the 4th at each mouse, respectively. Here, in drawing 7 thru/or drawing 12 , the arrow head showed the day which prescribed the dry matter of MAKA for the patient.

[0056]

Consequently, the mouse which mileage extended one day and two days after administration whenever it made the dry matter of MAKA prescribe for the patient was observed. Extension of mileage has been checked on the 1st and the 2nd after prescribing the dry matter of MAKA for the patient in four mice, the mouse (male 1) specifically shown in the inside of six mice shown in drawing 7 thru/or drawing 12 , and drawing 7 , the mouse (male 3) shown in drawing 9 , the mouse (female 5) shown in drawing 11 , and the mouse (female 6) shown in drawing 12 .

[0057]

Moreover, although the measurement of mileage of the mouse (female 4) shown in drawing 10 became impossible from the 6th day of experiment initiation on the way, it has checked stretch of mileage in administration of MAKA in an experiment opening day.

[0058]

From the above thing, among six animals, whenever it prescribed MAKA for the patient in five mice, improvement in tenacity has been checked by intake of MAKA by having checked extension of mileage. Moreover, in each mouse other than the mouse (female 2) shown in drawing 8 , it has checked that there was a significant difference statistically by $P< 0.05$.

[0059]

(Example 1 of pharmaceutical preparation)

Citrus flavor 0.01g and 10g of potato starch were mixed to 1g of powder of the MAKA extractives powder obtained in the example 1 of an experiment, and the tablet (food) was prepared with the conventional method.

[0060]

(Example 2 of pharmaceutical preparation)

Water was added to the thing of a presentation which added 10g of purified sucrose, and citrus flavor 0.05g to 0.5g of **** of the MAKA extractives powder obtained in the example 1 of an experiment, it considered as 120ml of whole quantity, and the drink product (drinkable preparations) was prepared as plastics bottle stuffing.

[0061]

[Effect of the Invention]

According to the functional food containing MAKA according to claim 1, the amount of growth hormones in blood can be gone up by taking in the functional food containing MAKA.

[0062]

According to the functional food containing MAKA according to claim 2, tenacity can be increased by taking in the functional food containing MAKA.

[0063]

According to the functional food containing MAKA according to claim 3, in addition to the effectiveness of the functional food containing MAKA according to claim 1, the so-called control of a degraded phenomenon is [the functional food containing MAKA] expectable by [for five weeks or more] taking in continuously.

[0064]

According to the functional food containing MAKA according to claim 4, the food containing MAKA can be more efficiently taken in by taking in the functional food containing the alcoholic extract of MAKA in addition to claim 1 thru/or the effectiveness of functional food which contained MAKA of a publication 3 either.

[0065]

Since the alcoholic extract of MAKA which contained 80% or less of water ethanol 60% or more is contained [according to the functional food containing MAKA according to claim 5] in addition to claim 1 thru/or the

effectiveness of functional food which contained MAKA of a publication 4 either, the functional food containing MAKA can be taken in more efficiently.

[Brief Description of the Drawings]

[Drawing 1] It is the graph which shows the example of an experiment which medicated the mouse (male 1) with the functional food containing MAKA of this invention.

(a) The graph which shows change of the weight before and behind MAKA administration.

(b) The graph which shows change of the food intake before and behind MAKA administration.

(c) The graph which shows change of the movement tenacity before and behind MAKA administration.

[Drawing 2] It is the graph which shows the example of an experiment which medicated the mouse (female 2) with the functional food containing MAKA same as the above.

(a) The graph which shows change of the weight before and behind MAKA administration.

(b) The graph which shows change of the food intake before and behind MAKA administration.

(c) The graph which shows change of the movement tenacity before and behind MAKA administration.

[Drawing 3] It is the graph which shows the example of an experiment which medicated the mouse (male 3) with the functional food containing MAKA same as the above.

(a) The graph which shows change of the weight before and behind MAKA administration.

(b) The graph which shows change of the food intake before and behind MAKA administration.

(c) The graph which shows change of the movement tenacity before and behind MAKA administration.

[Drawing 4] It is the graph which shows the example of an experiment which medicated the mouse (female 4) with the functional food containing MAKA same as the above.

(a) The graph which shows change of the weight before and behind MAKA administration.

(b) The graph which shows change of the food intake before and behind MAKA administration.

(c) The graph which shows change of the movement tenacity before and behind MAKA administration.

[Drawing 5] It is the graph which shows the example of an experiment which medicated the mouse (female 5) with the functional food containing MAKA same as the above.

(a) The graph which shows change of the weight before and behind MAKA administration.

(b) The graph which shows change of the food intake before and behind MAKA administration.

(c) The graph which shows change of the movement tenacity before and behind MAKA administration.

[Drawing 6] It is the graph which shows the example of an experiment which medicated the mouse (female 6) with the functional food containing MAKA same as the above.

(a) The graph which shows change of the weight before and behind MAKA administration.

(b) The graph which shows change of the food intake before and behind MAKA administration.

(c) The graph which shows change of the movement tenacity before and behind MAKA administration.

[Drawing 7] It is the graph which shows the transit time of the mouse (male 1) which carried out repetitive administration of the functional food containing MAKA same as the above.

[Drawing 8] It is the graph which shows the transit time of the mouse (female 2) which carried out repetitive administration of the functional food containing MAKA same as the above.

[Drawing 9] It is the graph which shows the transit time of the mouse (male 3) which carried out repetitive administration of the functional food containing MAKA same as the above.

[Drawing 10] It is the graph which shows the transit time of the mouse (female 4) which carried out repetitive administration of the functional food containing MAKA same as the above.

[Drawing 11] It is the graph which shows the transit time of the mouse (female 5) which carried out repetitive administration of the functional food containing MAKA same as the above.

[Drawing 12] It is the graph which shows the transit time of the mouse (female 6) which carried out repetitive administration of the functional food containing MAKA same as the above.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention]
This invention relates to the functional food containing MAKA.
[0002]

[Translation done.]

PRIOR ART

[Description of the Prior Art]
A growth hormone is fossa-hypophysis secreted, nitrogen maintenance capacity is improved, and when catabolism capacity declines, the effectiveness of promoting lipid mobilization and protein synthesis is known. And a growth hormone receives the secretion accommodation by various hormone, and has a pulsation secretion moving state, and homeostasis is maintained although a daily variation is accepted. However, if the secretion fall of a growth hormone takes place by aging etc., it is thought that it becomes easy to come out of the so-called degraded phenomena including the fall of the increment in Siwa or canities, physical strength, and the generative function.
[0003]
Then, although it is safe for the body instead of drugs and development of the so-called functional food which has the amount rise operation of growth hormones in blood is desired strongly, the present condition is that there is still nothing that fills this request completely.
[0004]
Conventionally, MAKA (repi DIUMU MEIENIWARUPU; Lepidium meyenii-Walp, Cruciferae) which is the high-ground native root vegetables of the Andes district in Peru is used for infertility treatment, nourishment sthenia, etc. as a tradition medicine for years among the natives of the South America Andes, it is used as a folklore medicine, and the effectiveness to malnutrition, anemia, infertility, energy ******, etc. is known (for example, the patent reference 1 and 2 reference.).
[0005]
[Patent reference 1]
JP,2000-316528,A (the two - 3rd page)
[0006]
[Patent reference 2]
JP,2001-136920,A (the five - 6th page)
[0007]

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EFFECT OF THE INVENTION

[Effect of the Invention]
According to the functional food containing MAKA according to claim 1, the amount of growth hormones in blood can be gone up by taking in the functional food containing MAKA.
[0062]
According to the functional food containing MAKA according to claim 2, tenacity can be increased by taking in the functional food containing MAKA.
[0063]
According to the functional food containing MAKA according to claim 3, in addition to the effectiveness of the functional food containing MAKA according to claim 1, the so-called control of a degraded phenomenon is [the functional food containing MAKA] expectable by [for five weeks or more] taking in continuously.
[0064]
According to the functional food containing MAKA according to claim 4, the food containing MAKA can be more efficiently taken in by taking in the functional food containing the alcoholic extract of MAKA in addition to claim 1 thru/or the effectiveness of functional food which contained MAKA of a publication 3 either.
[0065]
Since the alcoholic extract of MAKA which contained 80% or less of water ethanol 60% or more is contained [according to the functional food containing MAKA according to claim 5] in addition to claim 1 thru/or the effectiveness of functional food which contained MAKA of a publication 4 either, the functional food containing MAKA can be taken in more efficiently.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]
However, in the dry matter of above-mentioned MAKA, protein and a dietary fiber content are comparatively high. especially -- the content of a lysine or an arginine -- high -- moreover -- as a special component -- a benzyl guru -- chewiness -- glucosinolates, such as a rate (glucosinolate which generates benzyl or P-methoxyl benzyl isothiocyanate), -- Although existence of a steroid, flavonoid, alkaloid, polyphenol, a saponin, terpenes, etc. is known, about the physiological function of these components, or relation with effectiveness, it has the problem that it is hardly known.
[0008]
This invention was made in view of such a point, and offers the functional food containing MAKA which has the amount rise operation of growth hormones in blood.
[0009]

[Translation done.]

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MEANS

[Means for Solving the Problem]
The functional food containing MAKA according to claim 1 contains MAKA, and has the amount rise operation of growth hormones in blood.
[0010]
And the amount of growth hormones in blood can be moderately gone up by taking in the food containing MAKA, when the amount of growth hormones in blood falls.
[0011]
The functional food containing MAKA according to claim 2 contains MAKA, and has the increment operation in tenacity.
[0012]
And tenacity can be increased by taking in the food containing MAKA.
[0013]
In the functional food with which the functional food containing MAKA according to claim 3 contained MAKA according to claim 1, the amount of growth hormones in blood rises by continuation intake for five weeks or more.
[0014]
And the so-called control of a degraded phenomenon is [the food containing MAKA] expectable by [for five weeks or more] taking in continuously.
[0015]
The functional food containing MAKA according to claim 4 contains the alcoholic extract of MAKA in claim 1 thru/or the functional food which contained MAKA of a publication 3 either.
[0016]
And the food containing MAKA can be more efficiently taken in by taking in the functional food containing the alcoholic extract of MAKA.
[0017]
The functional food containing MAKA according to claim 5 contains the alcoholic extract of MAKA in claim 1 thru/or the functional food which contained MAKA of a publication 4 either, and this alcoholic extract contains 80% or less of water ethanol 60% or more.
[0018]
And the food containing MAKA can be more efficiently taken in by making the alcoholic extract of MAKA which contained 80% or less of water ethanol 60% or more contain.
[0019]
[Embodiment of the Invention]
Hereafter, the functional food containing MAKA of one gestalt of operation of this invention is explained.
[0020]
First, the dry matter (chip) of the root of MAKA is ground to 30 or more mesh 100 or less mesh extent. And the chip of the root of this ground MAKA is immersed in water alcohol for 72 or less hours for 48 hours or more at a room temperature (when gathering extraction efficiency, it is the temperature of about 40 degrees C), and an extractive matter is extracted. An extract may carry out concentration hardening by drying under reduced pressure as it is, and may add and carry out spray drying of the drying aid, such as a dextrin and a sorbitol, to an extract. Moreover, the extracted dry matter is again dissolved in water, and activated carbon, ion-exchange-resin processing, etc. may refine further, and you may condense or harden by drying. These dry matters are

suitably ground and used with a blender etc. The alcohol used is lower alcohol, such as ethanol and propanol, and it is desirable that 80% or less of water ethanol is usually included as alcohol 60% or more. The alcoholic extract extractives dry matter of MAKA is obtained these results.

[0021]

Subsequently, the water alcoholic extract extractives dry matters of MAKA may be powder, granulation, a tablet, a sugar-coated tablet, a capsule, liquids and solutions, and sirupy any as a gestalt offered as functional food which has the amount rise operation of growth hormones in blood which made this contain, and size enlargement of these may be suitably carried out with an assistant and the charge of aromatizing. As the excipient used and a diluent, the masking reagent of gelatin, a saccharide, starch, a fatty acid and its salt, fats and oils, talc, a physiological saline, and others etc. is mentioned.

[0022]

Although these things may be taken as they are, it is also convenient to mix food, such as various cooking articles, confectionery, and Kandy, and to take. Although individual difference and individual difference of a dose are large, it is 0.1g or more 10g or less as an alcoholic extract extractives dry matter which usually contains per adult day, 8.1% of moisture, and 78.9% of sugar.

[0023]

Furthermore, although it is satisfactory for usual state people eating the functional food which has the amount rise operation of growth hormones in blood which made the water alcoholic extract dry matter of the dry matter of MAKA contain every day, when secretion of a growth hormone decreases especially by a certain cause and the amount of growth hormones in blood falls, the continued intake for five weeks or more is usually desirable for at least four weeks.

[0024]

In addition, in the dry matter of MAKA, protein and a dietary fiber content are comparatively high, especially the content of a lysine or an arginine is high, and since existence of organic compounds, such as glucosinolate, a steroid, flavonoid, alkaloid, polyphenol, a saponin, and terpenes, is known as a special component, it is presumed that these special components are related to active oxygen elimination activity, hormone Mr. activity, immunity activation activity, etc. Moreover, since these organic compounds have effectiveness in infertility treatment to Homo sapiens especially, a phytoestrogen operation is expected by the glucosinolate and flavonoid. Furthermore, while the operation which reduces the blood sugar level with these organic compounds is expectable, facial treatment, a beautiful skin effect, etc. are expectable.

[0025]

[Translation done.]

EXAMPLE

[Example]
The functional food which has hereafter the amount rise operation of growth hormones in blood which made the alcoholic extract extractives dry matter of MAKA of this invention contain is further explained to a detail using the example of an experiment.
[0026]
(Example 1 of an experiment)
Preparation of MAKA extractives powder
First, it washed, dried MAKA from Peru (root) (TOWA business-affairs incorporated company sale) was judged, it considered as the chip, and what ground this to 30 or more-mesh 40 or less meshes was prepared.
[0027]
Subsequently, activated carbon and the pure water which carried out ion-exchange-resin processing were beforehand added to ethanol 98%, it diluted to 60%, and water ethanol was prepared, and 120kg of grinding objects of MAKA was added to 600l. of this, and it was immersed in it at the room temperature for 72 hours.
[0028]
And mass % added 3% of food-grade dextrin to 490l. or less of 480l. or more extracts which filtered out and obtained the solid, and was mixed to them, and spray drying of this was carried out and 15kg (MAKA extractives powder) of alcoholic extract spray drying objects of MAKA was obtained, and after this, the blender ground this dry matter and it mixed. Here, the analysis result of this MAKA extractives powder is shown in Table 1.
[0029]
[Table 1]

	分析値〔質量%〕
水分	8．1
蛋白質	3．3
脂質	1．2
水不溶性食物繊維	0．0
水可溶性食物繊維	6．7
糖 ※	78．9
灰分	1．8

※：計算値

[0030]
(Example 2 of an experiment)
The AIN-93 presentation which makes casein the source of protein (20 mass %) (Reeves etc.) Journal OBU new TORISHON, 123-volume 1923 pages, 1993 (J. it Nutrition(s)) Half-purified diet based on 123, 1923, and 1993 is considered as contrast foods. Addition of the MAKA extractives powder obtained in the example 1 of an experiment to contrast foods was carried out 5% (5M) 0.5% (0.5M) with the mass ratio, and what was adjusted so

that the proximate composition of feed might become the same as that of contrast foods was made into experimental diet (0.5M, 5M). The presentation of these feed is shown in Table 2. In addition, AIN-93 are the standard purified diet presentation for the nutrition research using the mouse and rat which the U.S. National Institute of Nutrition announced in 1993.

[0031]

[Table 2]

〔質量%〕

飼料成分	対照食 (MC)	0.5M	5M
マカ・エキスパウダ	0	0.5	5.0
ミルクカゼイン	20.0	20.0	19.8
L・シスチン	0.3	0.3	0.3
大豆油	10.0	9.9	9.9
ミネラル混合物（AIN-93G）	3.5	3.5	3.5
ビタミン混合物（AIN-93VX）	1.0	1.0	1.0
セルロースパウダ	5.0	5.0	4.7
コーンスターチ	36.8	36.4	32.8
α—コーンスターチ	13.2	13.2	13.2
シュークロース	10.0	10.0	10.0
コリン酒石酸重水素塩	0.25	0.25	0.25

[0032]

And after using each six groups at a time 7-weeks old male Wistar rats (it purchases from Japan SLC, Inc.) and carrying out preliminary breeding by contrast foods for one week, it is the temperature of 22.0**2.0 degrees C, the humidity of 55.0**5.0%, and the light-and-darkness change method (for a ** term, a dark term is from 8:00 p.m. to 8:00 a.m. from 8:00 a.m. to 8:00 p.m.) of 12 hours, and bred for five weeks under feed free intake with drinking water (tap water). In addition, this animal experiment was carried out in conformity with "the guide of the Kinki University medical department animal experiment." And weight and the amount of feed intake were measured every other day during the experiment. As a result, weight measured value is shown in Table 3, and the amount trend of feed intake is shown in Table 4.

[0033]

[Table 3]

体　重　推　移（各群６匹の平均体重ｇ）

試験開始から日目	対照食	０．５Ｍ	５Ｍ	試験開始から日目	対照食	０．５Ｍ	５Ｍ
2	１６７	１６６	１６６	２０	２６３	２６０	２５６
4	１８３	１８２	１７８	２２	２６８	２６６	２６２
6	１９４	１９７	１９２	２４	２７３	２７２	２６５
8	２１３	２１３	２０８	２６	２８０	２７６	２７２
１０	２２３	２２３	２２０	２８	２８５	２８２	２７５
１２	２３５	２３６	２３６	３０	２８８	２８５	２８０
１４	２３９	２４０	２３８	３２	２９４	２９２	２８２
１６	２４４	２４３	２４０	３４	２９８	２９６	２８９
１８	２５５	２５５	２４８	３６	３０４	３０１	２９３

[0034]
[Table 4]

各群の平均飼料摂取量　〔g/2匹/2日〕

試験開始から日目	対照食	０．５Ｍ	５Ｍ	試験開始から日目	対照食	０．５Ｍ	５Ｍ
2	５４	５０	４８	２０	６４	５６	５４
4	７４	６９	６２	２２	６１	６０	５７
6	７０	７６	６８	２４	５９	６５	５７
8	８２	７９	７８	２６	５８	５５	５４
１０	７１	７５	７７	２８	５５	５７	５３
１２	６６	６４	７１	３０	５４	５６	５５
１４	６５	６４	６２	３２	５４	５８	５２
１６	６４	６５	５６	３４	５３	５４	５４
１８	６３	６０	５５	３６	５４	５５	５５

[0035]
Moreover, it collected blood from the subclavian vein in part to the heparin (15 units) content silicon coat micro spitz under anesthesia with the ether by the conditions of not abstaining from food, after [of experiment initiation] two weeks (about 1ml), and the blood serum was separated (2500rpm, 15 minutes, 4 degrees C). Moreover, blood collecting five weeks after was performed on the conditions of not abstaining from food, from experiment initiation, the ether performed it from the abdominal aorta under anesthesia, and the plasma of the same conditions as the above was obtained.
[0036]
Furthermore, measurement of the amount of growth hormones in the plasma obtained after [of experiment initiation] two weeks and the plasma obtained after five weeks used the rat growth hormone enzyme immunoassay (EIA) system (Amersham Life Science, England). And the amount of hormone in the plasma of two weeks after is shown in Table 5, and the amount of growth hormones in the plasma obtained after five weeks is shown in Table 6.
[0037]

[Table 5]

2週間投与後の血漿中成長ホルモン濃度〔ｎｇ／ｍｌ〕		
対照食	０．５Ｍ	５Ｍ
９２．３±４．９	８８．７±８．０	８３．６±７．５

ｎ＝6、平均値±標準誤差

[0038]
[Table 6]

5週間投与後の血漿中成長ホルモン濃度〔ｎｇ／ｍｌ〕		
対照食	０．５Ｍ	５Ｍ
１０３．２±８．１	１２０．３±７．８	１２０．６±１２．６

ｎ＝6、平均値±標準誤差

[0039]
As shown in Table 3 and 4 these results, the difference was not accepted, but adverse reaction was not accepted in whenever [growth-with Wistar-rats / which prescribed for the patient and bred the feed which added MAKA extractives powder /, and Wistar rats which prescribed for the patient and bred contrast feed], and (gain of body weight), the amount of feed intake at all, either, but growth with all three favorable groups was accepted in them.
[0040]
Moreover, although, as for the amount of growth hormones in the plasma after two weeks of administration, the inclination low a little was seen in the experimental group (group which prescribed MAKA for the patient) as shown in Table 5 and 6, the significant difference was not accepted in 3 between groups. Furthermore, as for the amount of growth hormones in the plasma obtained after five weeks of administration, as compared with the control group, the high value was accepted by the experimental group (0.5M, 5 M car group).
[0041]
Therefore, when it continued for five weeks to Wistar rats, they were supplied with the feed which added the water alcoholic extract dry matter of the dry matter of MAKA and it was bred to them, the rat was grown favorably and the growth hormone in the plasma in these Wistar rats increased. Consequently, it is safe for the body, there is no side effect, and by taking in the functional food which made the water alcoholic extract dry matter of the dry matter of MAKA contain as a principal component showed that the amount of growth hormones in blood rose.
[0042]
(Example 3 of an experiment)
Next, the effect affect the tenacity of the mouse by the ingestion of functional food which made the alcoholic extract extractives dry matter of MAKA of this invention contain is explained using the example of an experiment.
[0043]
First, the purpose which evaluates the operation over the whole living body function to the beginning considered the effect of the ingestion of MAKA to tenacity.
[0044]
The DDY mouse of 11 weeks old considered to have reached the adult mostly as a candidate for evaluation of tenacity was used. These DDY(s) mouse was used after arriving at a laboratory, and carrying out training

breeding for one week. Moreover, as tenacity, each DDY mouse was put in inside the cylinder with a diameter of 15cm, each [these] DDY mouse was run with constant speed, the cylinder was rotated, and time amount (distance) until it becomes impossible for each [these] DDY mouse to run with constant speed was evaluated as an index. In addition, the transit experiment was measured in the same time zone of the days.
[0045]
Moreover, after MAKA used the dry matter of the root of MAKA as impalpable powder, it was suspended so that it might become water in ml and 0.25mg /, and carried out direct single-dose administration of the 0.25ml by the sound into the stomach of each DDY mouse.
[0046]
Here, although it divided into the group of ten animals, having assumed whether a big difference would have any mice in a transit moving state and measurement was begun at first about selection of a mouse, when individual difference did not select by the preliminary transit test greatly in respect of lack of transit capacity or transit volition etc., it became clear by the simple group division that it could not use for an experiment.
[0047]
Then, the individual was first selected on the basis of being stabilized comparatively and always running in the mouse of the same weeks old, although a difference is in transit capacity. However, since it was difficult to make two mouse groups (a control group and intake group) which do not have a difference in normal transit capacity greatly, it was stabilized comparatively and the transit time in MAKA administration order was always compared to the selected population it runs.
[0048]
Subsequently, as a result of investigating the effect which the capacity (ml) which prescribes MAKA for the patient by the sound is changed about the effect the administration capacity of MAKA affects intake of a diet, and it has on the intake of the diet of a mouse, when 0.5ml or more was prescribed for the patient, it became clear that the intake of a diet decreased and it was decided that administration capacity would be 0.1ml.
[0049]
Furthermore, change with the transit time before administration of MAKA (distance) and the transit time during three days (distance) after prescribing 0.25ml of 0.1mg [/ml] MAKA suspension for the patient was measured about seven mice (one-animal death) which the single-dose administration of MAKA selected as mentioned above about the effect which it has on the endurance running of a mouse. consequently, it is shown in drawing 1 thru/or drawing 6 -- as -- the inside of six animals -- four animals -- the transit time -- 24 hours after -- setting -- coming out -- 50% or less 25% or more -- it came out comparatively and increased. In addition, there was no change in two next animals. Moreover, although it was a reduction degree also after two days and three days, the somewhat high rate was shown. Furthermore, since it returned to the original rate after the 4th, it has been interpreted as maintaining the effectiveness of this amount of single-dose administration during the 3rd or less the 2nd day or more.
[0050]
From the result mentioned above, the effect which it has on the tenacity (endurance running) of the mouse by internal use of MAKA was considered. In addition, in order to grasp an amount with exact intake, a medicine was prescribed for the patient using the approach of carrying out forcible administration by the sound. As a result of giving 0.025mg [per animal / /] MAKA day by the administration capacity (0.1ml) which does not affect the diet intake of a mouse, among six animals, by four animals (66.6%), the increment in tenacity was accepted and the fall of tenacity was not shown in other two animals.
[0051]
Moreover, although it is as a result of four females and two males since one female died the middle among ten used mice (five males, five females), and three males did not become weak but it became measurement impossible for escape from a run state As shown in drawing 1 thru/or drawing 6 , among four animals, for the female, effectiveness was accepted by three animals (75%), and was accepted at a rate of one animal (50%) among two animals by the male.
[0052]
(Example 4 of an experiment)
Next, the effectiveness exerted on the tenacity of the mouse by the repetitive administration of the functional food which made the alcoholic extract extractives dry matter of MAKA of this invention contain is explained using the example of an experiment.
[0053]

First, the same DDY mouse (two males and four females) as the above-mentioned example 3 of an experiment was prepared, the ingestion of the dry matter of the same MAKA as the above-mentioned example 3 of an experiment was continued and carried out to each of each [these] mouse every count day of plurality, and repetitive administration was carried out.

[0054]

First, as shown in drawing 7 thru/or drawing 12 , the transit time for front [experiment initiation] three days was measured, and, specifically, the mean transit time for these three days was computed. In addition, the these-computed mean transit time was shown as a broken line in drawing 7 thru/or drawing 12 .

[0055]

Then, in each on the 11th and the 13th, specified quantity administration of the dry matter of MAKA was carried out [the experiment opening day (the 0th day) and] on the 4th at each mouse, respectively. Here, in drawing 7 thru/or drawing 12 , the arrow head showed the day which prescribed the dry matter of MAKA for the patient.

[0056]

Consequently, the mouse which mileage extended one day and two days after administration whenever it made the dry matter of MAKA prescribe for the patient was observed. Extension of mileage has been checked on the 1st and the 2nd after prescribing the dry matter of MAKA for the patient in four mice, the mouse (male 1) specifically shown in the inside of six mice shown in drawing 7 thru/or drawing 12 , and drawing 7 , the mouse (male 3) shown in drawing 9 , the mouse (female 5) shown in drawing 11 , and the mouse (female 6) shown in drawing 12 .

[0057]

Moreover, although the measurement of mileage of the mouse (female 4) shown in drawing 10 became impossible from the 6th day of experiment initiation on the way, it has checked stretch of mileage in administration of MAKA in an experiment opening day.

[0058]

From the above thing, among six animals, whenever it prescribed MAKA for the patient in five mice, improvement in tenacity has been checked by intake of MAKA by having checked extension of mileage. Moreover, in each mouse other than the mouse (female 2) shown in drawing 8 , it has checked that there was a significant difference statistically by $P< 0.05$.

[0059]

(Example 1 of pharmaceutical preparation)

Citrus flavor 0.01g and 10g of potato starch were mixed to 1g of powder of the MAKA extractives powder obtained in the example 1 of an experiment, and the tablet (food) was prepared with the conventional method.

[0060]

(Example 2 of pharmaceutical preparation)

Water was added to the thing of a presentation which added 10g of purified sucrose, and citrus flavor 0.05g to 0.5g of **** of the MAKA extractives powder obtained in the example 1 of an experiment, it considered as 120ml of whole quantity, and the drink product (drinkable preparations) was prepared as plastics bottle stuffing.

[0061]

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the graph which shows the example of an experiment which medicated the mouse (male 1) with the functional food containing MAKA of this invention.
(a) The graph which shows change of the weight before and behind MAKA administration.
(b) The graph which shows change of the food intake before and behind MAKA administration.
(c) The graph which shows change of the movement tenacity before and behind MAKA administration.
[Drawing 2] It is the graph which shows the example of an experiment which medicated the mouse (female 2) with the functional food containing MAKA same as the above.
(a) The graph which shows change of the weight before and behind MAKA administration.
(b) The graph which shows change of the food intake before and behind MAKA administration.
(c) The graph which shows change of the movement tenacity before and behind MAKA administration.
[Drawing 3] It is the graph which shows the example of an experiment which medicated the mouse (male 3) with the functional food containing MAKA same as the above.
(a) The graph which shows change of the weight before and behind MAKA administration.
(b) The graph which shows change of the food intake before and behind MAKA administration.
(c) The graph which shows change of the movement tenacity before and behind MAKA administration.
[Drawing 4] It is the graph which shows the example of an experiment which medicated the mouse (female 4) with the functional food containing MAKA same as the above.
(a) The graph which shows change of the weight before and behind MAKA administration.
(b) The graph which shows change of the food intake before and behind MAKA administration.
(c) The graph which shows change of the movement tenacity before and behind MAKA administration.
[Drawing 5] It is the graph which shows the example of an experiment which medicated the mouse (female 5) with the functional food containing MAKA same as the above.
(a) The graph which shows change of the weight before and behind MAKA administration.
(b) The graph which shows change of the food intake before and behind MAKA administration.
(c) The graph which shows change of the movement tenacity before and behind MAKA administration.
[Drawing 6] It is the graph which shows the example of an experiment which medicated the mouse (female 6) with the functional food containing MAKA same as the above.
(a) The graph which shows change of the weight before and behind MAKA administration.
(b) The graph which shows change of the food intake before and behind MAKA administration.
(c) The graph which shows change of the movement tenacity before and behind MAKA administration.
[Drawing 7] It is the graph which shows the transit time of the mouse (male 1) which carried out repetitive administration of the functional food containing MAKA same as the above.
[Drawing 8] It is the graph which shows the transit time of the mouse (female 2) which carried out repetitive administration of the functional food containing MAKA same as the above.
[Drawing 9] It is the graph which shows the transit time of the mouse (male 3) which carried out repetitive administration of the functional food containing MAKA same as the above.
[Drawing 10] It is the graph which shows the transit time of the mouse (female 4) which carried out repetitive administration of the functional food containing MAKA same as the above.
[Drawing 11] It is the graph which shows the transit time of the mouse (female 5) which carried out repetitive administration of the functional food containing MAKA same as the above.
[Drawing 12] It is the graph which shows the transit time of the mouse (female 6) which carried out repetitive

administration of the functional food containing MAKA same as the above.

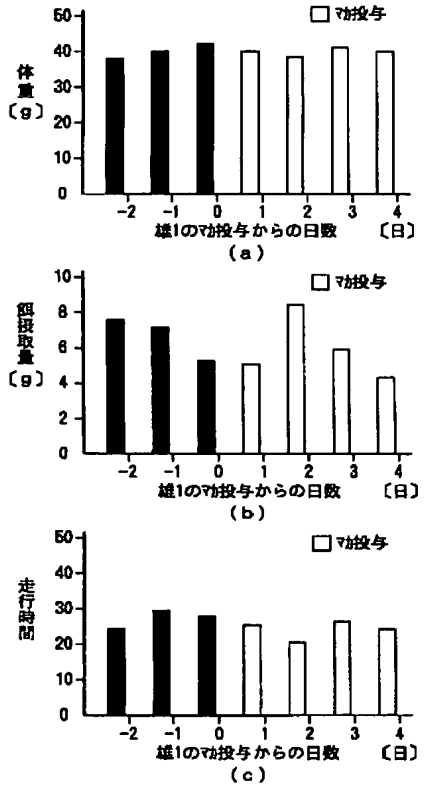
[Translation done.]

* NOTICES *

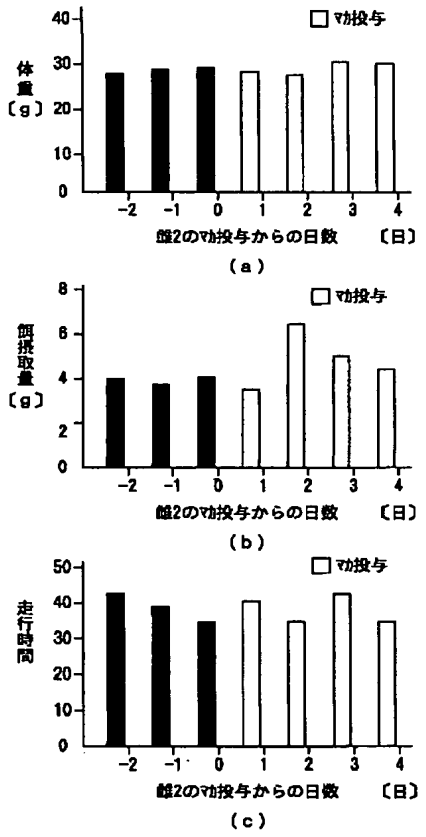
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

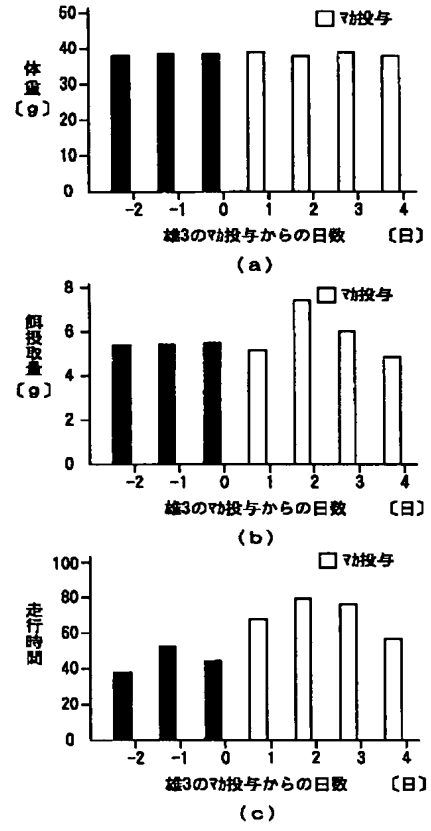
[Drawing 1]



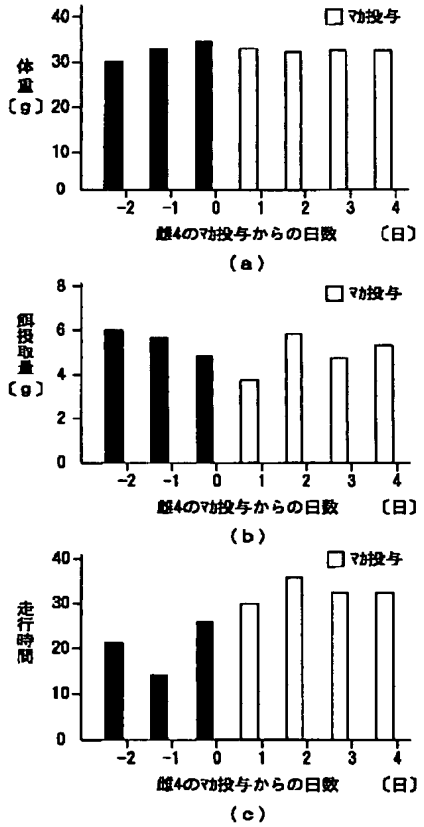
[Drawing 2]


□マカ投与
体重〔g〕
40
30
20
10
0
-2 -1 0 1 2 3 4
雌2のマカ投与からの日数 〔日〕
(a)
□マカ投与
摂餌取量〔g〕
8
6
4
2
0
-2 -1 0 1 2 3 4
雌2のマカ投与からの日数 〔日〕
(b)
□マカ投与
走行時間
50
40
30
20
10
0
-2 -1 0 1 2 3 4
雌2のマカ投与からの日数 〔日〕
(c)

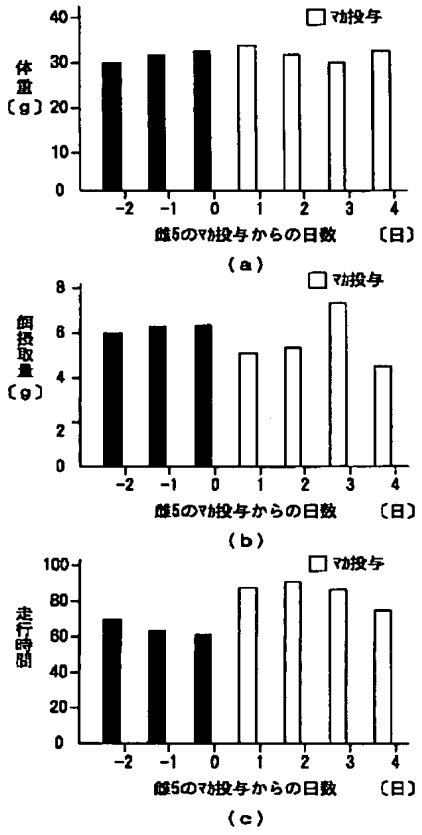
[Drawing 3]


□マカ投与
体重〔g〕
50
40
30
20
10
0
-2 -1 0 1 2 3 4
雄3のマカ投与からの日数 〔日〕
(a)
□マカ投与
摂餌取量〔g〕
8
6
4
2
0
-2 -1 0 1 2 3 4
雄3のマカ投与からの日数 〔日〕
(b)
□マカ投与
走行時間
100
80
60
40
20
0
-2 -1 0 1 2 3 4
雄3のマカ投与からの日数 〔日〕
(c)

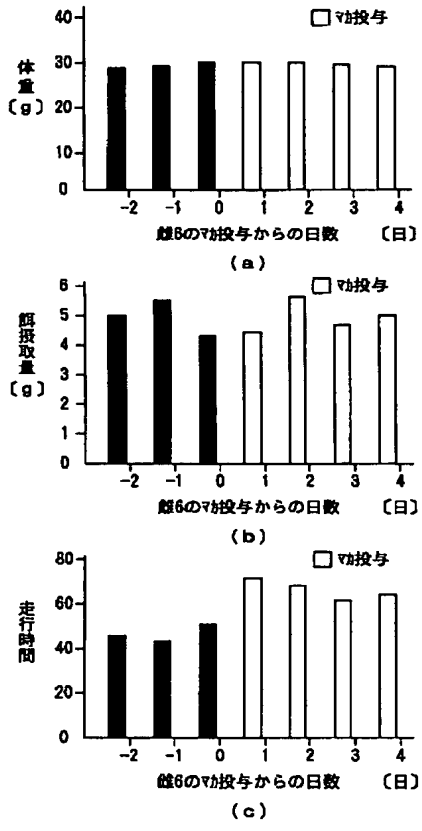
[Drawing 4]



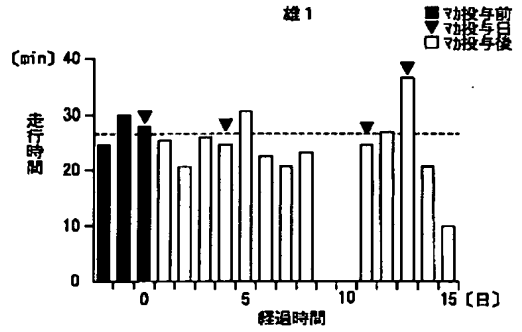
[Drawing 5]


マカ投与
体重〔g〕
40
30
20
10
0
-2 -1 0 1 2 3 4
雌5のマカ投与からの日数 〔日〕
(a)
マカ投与
摂餌量〔g〕
8
6
4
2
0
-2 -1 0 1 2 3 4
雌5のマカ投与からの日数 〔日〕
(b)
マカ投与
走行時間
100
80
60
40
20
0
-2 -1 0 1 2 3 4
雌5のマカ投与からの日数 〔日〕
(c)

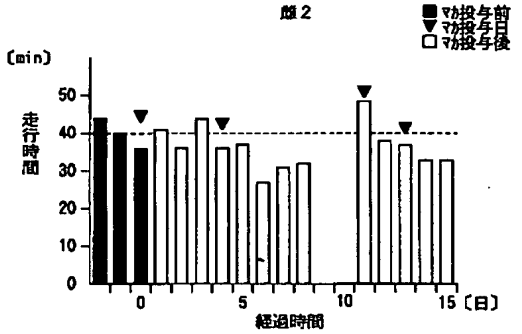
[Drawing 6]


マカ投与
体重〔g〕
40
30
20
10
0
-2 -1 0 1 2 3 4
雌6のマカ投与からの日数 〔日〕
(a)
マカ投与
摂餌量〔g〕
6
5
4
3
2
1
0
-2 -1 0 1 2 3 4
雌6のマカ投与からの日数 〔日〕
(b)
マカ投与
走行時間
80
60
40
20
0
-2 -1 0 1 2 3 4
雌6のマカ投与からの日数 〔日〕
(c)

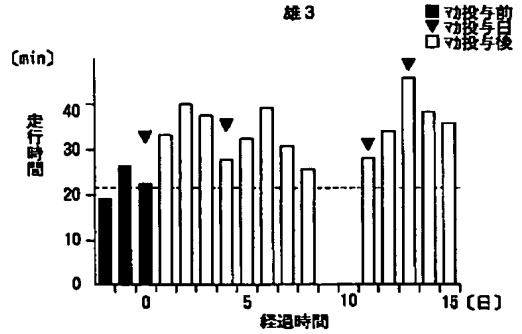
[Drawing 7]



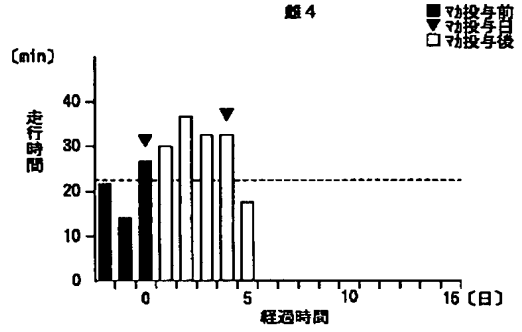
[Drawing 8]



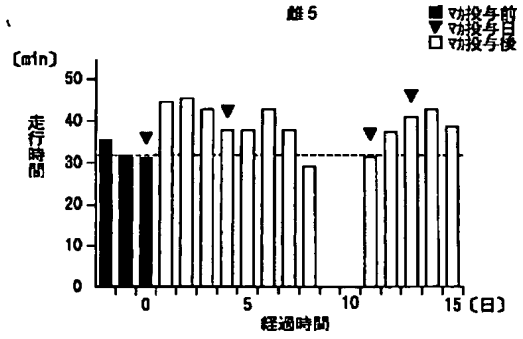
[Drawing 9]



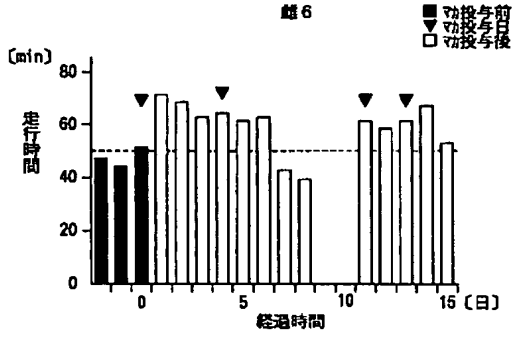
[Drawing 10]



[Drawing 11]



[Drawing 12]



[Translation done.]

AN 2003:277167 CAPLUS
DN 138:276809
TI Studies on hygroscopic abilities of the water-extracted **Maca**
AU Shimofuruya, Hiroshi; Suzuki, Ikukatsu; Funieda, Yoshihiko
CS Suzuka Natl. Coll. Tech., Japan
SO Kiyo - Suzuka Kogyo Koto Senmon Gakko (2003), 36, 131-134
CODEN: SKSKDJ; ISSN: 0286-5483
PB Suzuka Kogyo Koto Senmon Gakko
DT Journal
LA Japanese
TI Studies on hygroscopic abilities of the water-extracted **Maca**
AB Hygroscopic abilities of **Maca**, extd. from the powder of **Lepidium meyenii** Walp, were examd. by physicochem. techniques in comparison with those of urea, glycerol and D-glucitol used in cosmetics. When the relative humidity increased from 31.0% to 91.0%, the increased amts. of the **moisture** absorption capacity of urea and D-glucitol after 24 h standing were 85% and 66%, resp., whereas its amt. of the H2O-extd. **Maca** was 28%. The **moisture** absorption capacity of urea and D-glucitol were dependent on changes in the relative humidity, while the **moisture** absorption capacity of H2O-extd. **Maca** was not greatly influenced by changes in the relative humidity. Also, in the dry SiO2-gel desiccator, the H2O-extd. **Maca** showed the best **moisture** retention capacity among the samples tested. Probably the H2O-extd. **Maca** was a desirable hygroscopic material because it exhibited relative high hygroscopic ability under conditions with various humidity and high **moisture** retention capacity even in the dry SiO2-gel desiccator.
ST humidity hygroscopic ability water extd **Maca**
IT Cosmetics
Hygroscopic substances
Lepidium peruvianum
(hygroscopic abilities of water-extd. **Maca**)
IT Humidity